

Laparoscopic Common Bile Duct Exploration

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Abstract

Stones in the common bile duct are a common finding and is one of the most common cause for obstructive jaundice. These calculi may be primary ductal stones or secondary, which descend from the gallbladder. There are various therapeutic options for its management and could vary from chemical to surgical management. A combination of different methods is useful in those cases where isolated techniques are not successful. Based on the clinical situation at hand, the facilities available and the level of technical expertise, one should select the ideal modality for its successful management.

Keywords: Laparoscopic CBD exploration, ERCP, open surgical exploration of CBD.

AIMS

To present an interesting case of obstructive jaundice, its investigation and management.

To discuss the various methods of management of common bile duct stones, with a view to emphasize the ideal treatment modality.

MATERIALS AND METHODS

An interesting case of obstructive jaundice encountered by us in our clinical practice is mentioned here with its investigations and management.

A literature search on PubMed and Google was done using the keywords laparoscopy, common bile duct stones, obstructive jaundice, ERCP, lithotripsy, chemical dissolution.

CASE REPORT

A 44-year-old lady was admitted with abdominal pain, yellowish discoloration of eyes and itching of skin for one month. She also complained of loss of appetite, nausea and pale colored stools. She had no other significant past history. She was not a diabetic or hypertensive.

On examination:

- Obese, short statured lady
- Febrile
- Icterus + +
- R subcostal tenderness +
- No mass
- No organomegaly
- No free fluid

- No lymphadenopathy
- PR/ PV – NAD.

Investigations

- TC-10,100.
- LFT's – T. Bilirubin- 8.3, Direct- 5.6, Indirect- 2.7, SGPT – 150, Alk. Phos.- 1380, GGTP- 385.
- USG – Thick walled gallbladder, dilated CBD, IHBR, with multiple calculi.
- MRCP – Thick walled gallbladder, dilated CBD, IHBR, filled with multiple calculi (Fig. 1).

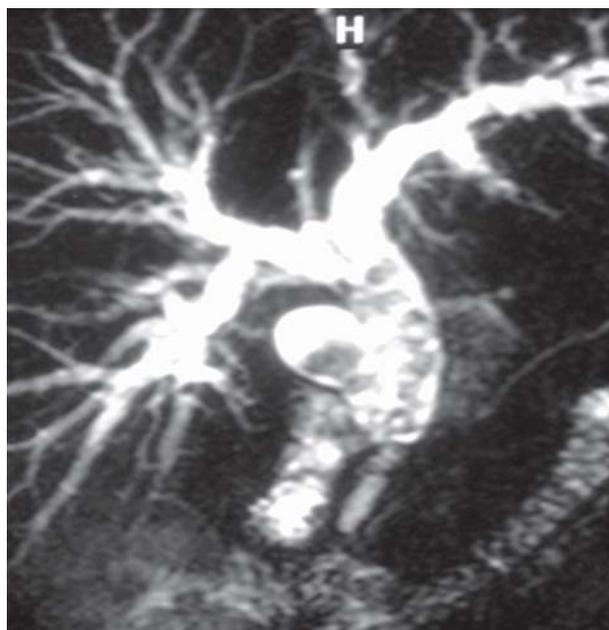


Fig. 1: MRCP showing dilated biliary ductal system with multiple calculi

Management

The plan was to stabilize the patient, decrease S. Bilirubin preoperatively and take up the patient for surgery. The patient was hydrated with intravenous fluids, antibiotics and proton pump inhibitors were given. One gram of Inj. Vitamin K was given intramuscularly for three days.

The patient was then subjected to ERCP. The findings of which were:

- Dilated CBD, short parallel cystic duct, multiple calculi.

Sphincterotomy was done and one calculus extracted from the CBD. A pigtail stent was placed. Pus was seen while cannulating the cystic duct.

After 48 hours the patient was taken up for surgery. A laparoscopic common bile duct exploration, extraction of all stones, T-tube drainage and cholecystectomy was done. The postoperative period was uneventful and the patient was discharged on the seventh postoperative day. She was reviewed after three weeks when a T-tube cholangiogram was done and the T-tube was removed after ensuring that no stones were present in the duct.

DISCUSSION

Introduction

Ductal calculi have a varied clinical presentation and management. Therapeutic options differ from open surgery to endoscopic and laparoscopic methods. Laparoscopic biliary surgery has advanced significantly over the last decade. Its introduction has made it possible to overcome some of the drawbacks of other therapeutic approaches. This article analyses the current management of ductal calculi.

Ductal Calculi

Primary

Primary calculi form within the bile ducts. They should be suspected if a patient develops stones two years or longer, after cholecystectomy, or if their composition differs from that of gallbladder calculi. These are made of soft brown pigment and harbour bacteria within surface pits thereby have a strong association with biliary infection and stasis.

Secondary

Secondary calculi form in the gallbladder and then migrate to the ductal system. In this case the composition is identical to gallbladder calculi.

Retained

These are calculi that are undetected (missed), or detected but intentionally not removed during surgery, or other

treatment for ductal calculi. They cause symptoms within two years of the initial surgery or treatment.

Recurrent

These are primary ductal calculi composed of soft brown pigment that form two years after common duct exploration or other treatment.

There are various therapeutic options available for the management of common bile duct stones:

- Open surgery
- Laparoscopy
- Endoscopy
- Lithotripsy
- Chemical dissolution.

Role of Open Surgery

- Patients unfit for laparoscopic surgery
- All surgeons attempting laparoscopic biliary surgery should have experience of open biliary surgery
- In the event of any mishap or in the presence of significant technical difficulty the laparoscopic surgeon should be able to convert to open surgery and complete the operation.

Laparoscopic Removal of Ductal Stones

Bile duct exploration can be done through the cystic duct and the common bile duct. Laparoscopy can also be combined with other methods like endoscopy and lithotripsy.

However, not all patients can undergo a transcystic exploration and will require a supraduodenal choledochotomy. The indications for choledochotomy are:

- Presence of large (>1 cm) calculi
- Several (> 5 stones)
- Stones in the common hepatic duct
- Very low and spiral cystic duct–common hepatic duct junction.

Once the bile duct has been explored, a T-tube drainage, a biliary enteric anastomosis or a direct closure of the bile duct can be performed. The indications for T-tube drainage are:

- To prevent bile leakage from the choledochotomy at the lower end of the CBD.
- Large CBD (> 2 cm) and multiple primary brown stones.

The T-tube is also useful for removal of retained stones by flushing or by the *Burhenne's technique* using baskets for retrieval. The tube is kept *in situ* for two weeks and following this a T-tube cholangiogram is done. If the biliary tree is normal the tube is removed. If stones are detected

they can be removed by endoscopic stone extraction or through the mature T-tube tract (some 4 weeks later).

Other techniques are also available. Laparoscopic transcystic balloon dilatation of the Sphincter of Oddi (LTBDS). It has the advantage of avoidance of sphincterotomy. Percutaneous papillary balloon dilatation is another therapeutic option that can be performed prior to laparoscopic cholecystectomy (LC) or on the operating table immediately after LC. Ductal calculi can be pushed into the duodenum safely and effectively by this technique. Combined laparoscopic and endoscopic treatment can also be done.

Intraoperative Fluorocholangiography

It is a very effective technique for the demonstration of the ductal system intraoperatively and for the detection of ductal calculi. The rate of CBD injury is significantly lower when IOFC is used. Routine cholangiography allows the discovery of concomitant common duct stones.

Choledochoscopy

This method enables the direct visualization of the ducts and if stones are encountered they can be removed by using a Dormia basket or Fogarty's balloon catheters. Choledochoscopy enables the confirmation of ductal stones and may be used for their removal during LC. It may prevent choledochotomy or endoscopic sphincterotomy.

Endoscopy

There is a definite role for endoscopic intervention. Stones can be removed by endoscopic sphincterotomy and stone retrieval with a balloon or Dormia basket. Endoscopy can also be done in combination with mechanical or extracorporeal shock wave lithotripsy (ESWL). Calculi can be removed through an intact papilla after medical or balloon dilatation of the sphincter. The ductal system can be stented after stone extraction. As mentioned previously, it can be used in combination with laparoscopy.

Lithotripsy

Mechanical, extracorporeal shock wave lithotripsy (ESWL) and pulse dye laser lithotripsy are used today.

The *indications for lithotripsy* are:

Large stones.

Incongruity of stone and ampulla, choledochal stricture and incarcerated stone masses.

The *complications of ESWL* are:

- Cutaneous bruising,
- Hemobilia

- Fall of hemoglobin
- Rarely empyema of gallbladder and death
- Cardiac arrhythmias
- Bacteremia.

Chemical Methods

The chemical agents available are Ceruletide IV infusion. Methyl tertbutyl ether (MTBE) and Mono octanoin can be used as dissolution agents.

CONCLUSION

LCBDE is a technically feasible procedure with low complication and mortality rates, although it requires careful patient selection and a variety of techniques and equipment. Multiple modalities are available for the management of ductal calculi. Based on the clinical situation at hand, facilities available and technical expertise, the ideal modality or modalities should be selected to treat the individual patient.

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